Three new species of *Euphorbia* L. subgenus *Chamaesyce* Rafinesque (Euphorbiaceae) from central and northern Australia

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Abstract

Thomson, B.G. Three new species of *Euphorbia* L. subgenus *Chamaesyce* Rafinesque (Euphorbiaceae) from central and northern Australia. Nuytsia 8(3): 351-360 (1992). *Euphorbia centralis* from central Australia, *E. maconochieana* from the Victoria River and *E. kimberleyensis* from the northern Kimberley region are described, illustrated and their affinities with related species discussed. *E. vaccaria* Baillon is lectotypified.

Introduction

Euphorbia L. is a worldwide genus of primarily sub-tropical and temperate distribution. It contains approximately 2000 species (Willis 1966) and is represented in Australia by an estimated 45 species.

Bentham (1873) included 18 species in his revision of the genus. These he treated in 2 sections; *Eremophila* Boiss. with 1 species and *Anisophyllum* (the correct author being Roeper rather than Roxborough as stated) with 17. Bentham later transferred the single species that he had placed in section *Eremophila* to section *Eremophyton* Boiss. (Bentham & Hooker 1880). This section has since been given sub-generic status by Wheeler (1943) and now includes five Australian species (Hassall 1977).

Section *Anisophyllum* had also been given sub-generic status (Gaucher 1898), however, the name at this level of classification was preoccupied. The name correctly applied at sub-generic rank to this taxon is *Chamaesyce* Rafinesque 1817 (Croizat 1938, Wheeler 1943).

In 1821 S.F. Gray elevated *Chamaesyce* to generic status in 'A Natural Arrangement of British Plants'. Since this time many researchers have supported its retention at this level (Croizat 1938, Webster 1975) and many have rejected it (Wheeler 1941, Radcliffe-Smith 1975). Hassall (1976) appraised the situation as it related to Australian species and supported the retention of *Chamaesyce* as a distinct genus. This change was not, however, widely accepted as evidenced by the treatments of Euphorbiaceae in many subsequent state and regional floras.

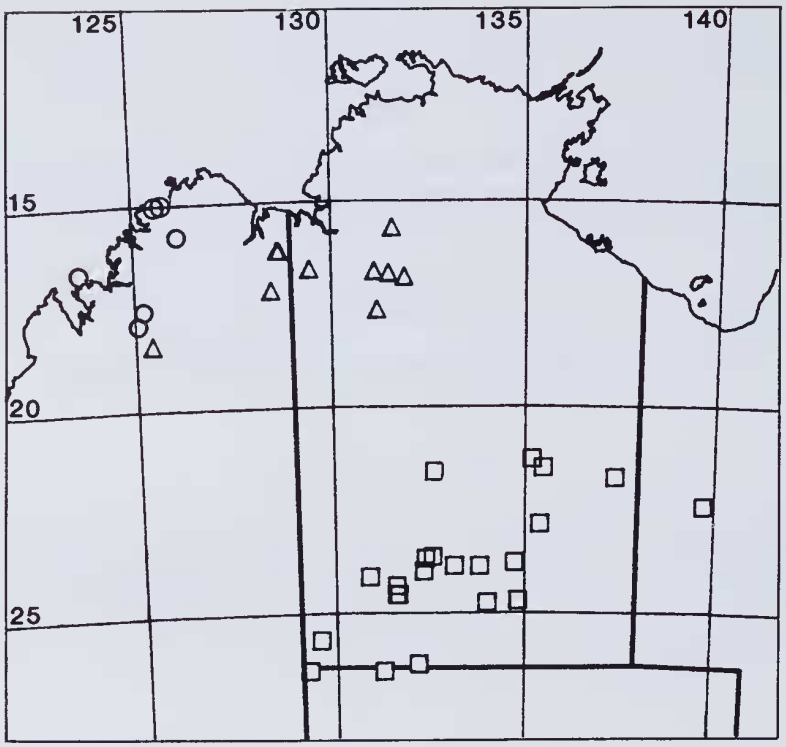

Figure 1. Distribution of *Euphorbia centralis* (□), *E. maconochieana* (△), and *E. kimberleyensis* (○).

Most authors agree that the taxon *Chamaesyce* is a natural one. The difficulties arise, however, in concisely defining the group. As Wheeler (1941) points out, it is with the greatest difficulty that *Chamaesyce* can be defined so as to exclude all members of other taxa and, at the same time, include all members of *Chamaesyce*. Although this statement was applied by Wheeler to the characters detailed by Croizat (1938) and earlier authors, it can be just as readily applied to the more modern arguments citing carbon fixation pathways (Webster *et al.* 1975) and cytological evidence (Hassall 1976).

A most important feature that serves to define *Chamaesyce* is the unique growth habit whereby the main stem axis aborts its apical meristem just above the first pair of true leaves. All subsequent growth arises sympoidally from the region of the cotylendonary nodes (Croizat 1938). This character is clearly seen in many of the prostrate species. Many, however produce only a single, erect stem and, in these cases, the interruption of the primary axis becomes particularly difficult if not impossible to observe in the mature plant. Croizat (1938) illustrates this feature. Thus, while the character is diagnostic of *Chamaesyce*, it is not particularly helpful in terms of practical taxonomy.

In this study and in future work, including the preparation of the treatment for the Flora of Australia, I follow Wheeler (1941) in accepting *Chamaesyce* at a sub-generic level.

The species dealt with below, are members of sub-genus *Chamaesyce* Rafinesque and are the first of a number of new taxa that have been revealed as a result of studies undertaken to provide an account for the Flora of Australia.

Descriptions and lectotypification

1. Euphorbia centralis B.G. Thomson, sp. nov. (Figure 2)

E. australi Boissier affinis, ab qua foliis late ovatis vel orbiculatus, serratis, appendicis glandis distincte laciniata, suffruticoso habitu distinguenda.

Typus: 3 km SW of Alice Springs, Northern Territory, 23° 35' S, 133° 50' E, 18 January 1990, *B.G. Thomson* 3408 (holo: DNA; iso: AD, BRI, CANB)

Erect or occasionally decumbent annual or perennial *sub-shrub* to 30 cm tall, multi-stemmed from the base. *Stems* puberulous to pilose with hairs 0.2-1 mm long. *Stipules* triangular, 0.2-0.4 mm long, margins lacerate and with ciliate hairs. *Leaf lamina* broad-ovate to orbicular, 3-5.5 x 1.5-5 mm, surfaces puberulous to pilose, margins serrate in the upper half, base oblique, apex obtuse. *Petioles* 0.5-1.3 mm long. *Inflorescence* in form of cyathia, solitary, axillary, throughout the plant or in upper parts only. *Cyathia* turbinate, 0.8-1.1 x 0.8-1.1 mm, puberulous to hispid. *Cyathial lobes* triangular, margins ciliate with stiff, white hairs. *Glands* oblong, concave, 0.2-0.4 x 0.1-0.3 mm. *Gland appendages* 0.6-1.3 x 0.3-0.5 mm, light green, cream, pink or red, margins strongly laciniate. *Androphores* level with the cyathial rim or exserted. *Gynophore* glabrous or pubescent, 1.3-2 mm long. *Capsule* 1.5-2 x 1.8-2.2 mm, muricate to hispid. *Styles* 0.3-0.4 mm long, glabrous. *Seeds* narrowly ovoid, 0.9-1.5 x 0.5-0.6 mm, tetragonous to tetraquetrous, rugose, brown (or mottled creamy brown with mucilage coat intact).

Selected Specimens. NORTHERN TERRITORY: James Range, 3 km N of Hugh River, *A.C. Beauglehole* 24586 (CANB, DNA); Hatches Creek Mine, 20° 55' S, 135° 12' E, *D.V. McKey* 302 (DNA); 7 miles NNE of Willowra Homestead, 21° 15' S 132° 37' E, *P.K. Latz* 1245 (DNA); 'Victory Downs' Station, 25° 59' S 132° 10' E, *P.K. Latz* 5099 (BRI, DNA); 22 miles SSW of Georgina Downs Station, 21° 22' S, 137° 24' E, *R.A. Perry* 3471 (CANB, DNA); 5 km WNW of Supplejack Bore, 'Elkedra' Station, 21° 10' S, 135° 30' E (DNA); 6 km E of John Hayes Rockhole, Trephina National Park, 23° 31' S, 134° 22' E, *B.G. Thomson* 1496 (DNA); 1 km S of Muranji Rockhole, Mt Winter, 23° 49' S, 130° 53' E, *B.G. Thomson* 1552 (AD, DNA, NT); eastern end of Harts Range, 23° 03' S, 134° 39' E, *B.G. Thomson* 2413 (DNA, MEL, NT); Mt Zeil, 23° 24' S, 132° 23' E, *B.G. Thomson* 2737 (DNA).
SOUTH AUSTRALIA: Musgrave Range, 1 mile E of Mt Woodroffe, *R. Hill & T.R.N. Lothian* 712 (AD, DNA); Kalka, Tomkinson Ranges, 26° 07' S, 129° 10' E, *A. Kalotas* 831 (DNA).
QUEENSLAND: 3 miles NW of 'Buckingham Downs' Station, *M. Lazarides* 4345, (CANB, DNA).

Distribution. E. centralis occurs from the Tennant Creek region (NT) to the Musgrave Ranges (SA) and from Mt Isa (Qld), west to the Docker River region (NT). (Figure 1)

Habitat. Found commonly on limestone, quartzite and sandstone ranges and low hills.

Affinities. This species is closely allied to *E. australis* Boissier but differs in having strongly laciniate gland appendages and more orbicular, deeply serrate leaves. Mature plants exhibit a rounded, shrub-like habit, the lower leaves withering but often persisting on the stems.

Conservation status. *E. centralis* is common and well represented in collections from central Australia and can not be considered as rare or endangered.

Etymology. The specific epithet relates to the species' central Australian distribution.

2. Euphorbia vaccaria Boiss., Adansonia 6: 286 (1866).*Type citation*: 'Exs. *F. Mueller*, Victoria River (herb.!). - *Id.* "Rocky high hills Hierson island, Nickol bay."*Lectotype* (here chosen): Nickol [Nichol] Bay, *P. Walcott* (MEL 1551017).

Typification. Baillon (1866) described *Euphorbia vaccaria* and cited material collected by Mueller from the Victoria River and by an unknown collector from Rocky High Hills, Heirson (Hearson) Island, Nickol (Nichol) Bay. In the course of this study, three specimens collected by Mueller from the Victoria River and named by him as *E. vaccaria* were examined. These specimens were located in MEL (MEL 1551016, 1551015, 1551018). Also located in MEL was the Heirson (Hearson) Island specimen bearing an original, hand-written label including the details cited by Baillon and the collector's initials. A comparison of handwriting confirmed that this specimen was one collected by Pemberton Walcott who visited Nickol (Nichol) Bay with the F.T. Gregory Expedition from May to July 1861. According to Baillon, who worked in Paris, these specimens were received on loan from Mueller. A search in Paris failed to locate any further material.

On close inspection of these syntypes it was apparent that they represented two separate taxa, the material collected by Mueller being quite different from Walcott's specimen. Baillon's protologue describes *E. vaccaria* as villous and, in this respect his description matches Walcott's specimen but is at odds with the Mueller collections. Mueller's specimens have a short, puberulous indumentum which is only visible under magnification. In no way could they be considered as villous even allowing for the broadest interpretation of the term.

Although the Walcott specimen is cited in the protologue without the collector's name, Baillon has included sufficient details to reliably establish it as a syntype. The same, however, can not be said for the Mueller material. Although the three specimens examined were collected from the Victoria River and bear label data that agree with the protologue, it is not clear which of these specimens were seen by Baillon. Baillon apparently did not annotate any of the material that he examined on loan from Mueller.

In consideration of the above points, I have chosen the Walcott specimen (MEL 1551017) as the lectotype for *E. vaccaria*. The Mueller material represents a new species described below as *E. maconochieana*.

3. Euphorbia maconochieana B.G. Thomson sp. nov. (Figure 3)

E. schultzio Benth. affinis, ab qua appendicis glandis petaloidea grandi, aba, integra, capsula parviore, marginibus folii integris distinguenda.

Typus: Cahills Crossing; Victoria River crossing on the Top Springs to 'Victoria River Downs' road, N.T., 16° 20' S, 131° 07' E, *B.G. Thomson* 3486 (holo: DNA; iso: AD, BRI, PERTH).

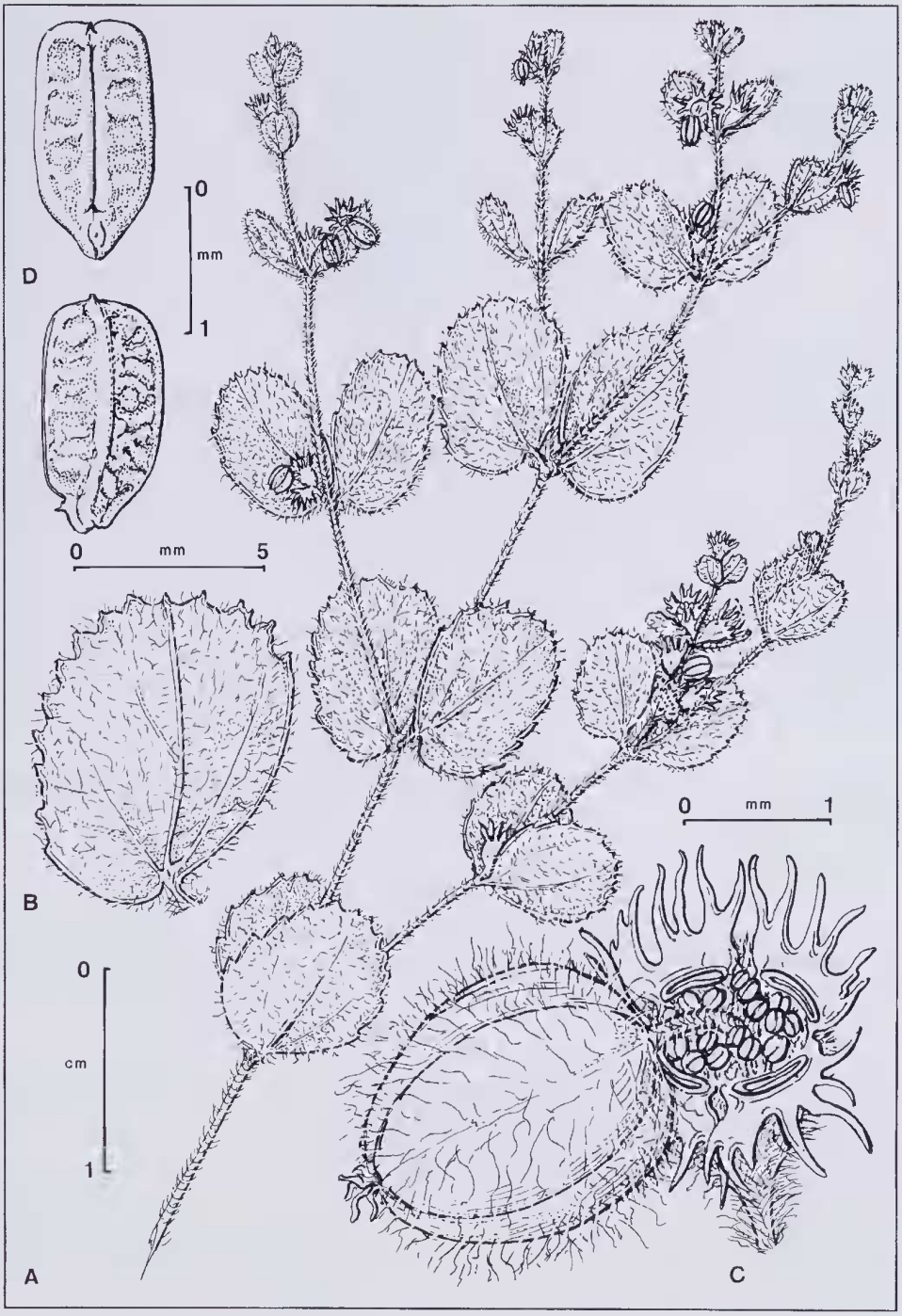

Figure 2. *Euphorbia centralis* A - habit, B - leaf, C - cyathia and capsule, D - seed. From *B.G. Thomson* 3408.

Prostrate, annual *herb*. *Stems* puberulous with curved or occasionally straight hairs to 0.2 mm long. *Stipules* subulate, 0.2-0.5 mm long, often divided into several filiform segments, margins ciliate. *Leaf lamina* elliptic to obovate, 6-15 x 2-7 mm, upper surface glabrous to puberulous, lower surface puberulous, margins entire, base strongly oblique, apex obtuse. *Petioles* 0.5-1 mm long. *Inflorescence* in form of cyathia, solitary, axillary, throughout the plant or occasionally in upper parts only. *Cyathia* turbinate, 1.3-1.9 x 1.2-1.7 mm, densely muricate, puberulous. *Cyathial lobes* triangular, margins ciliate with stiff, white hairs. *Glands* oblong, flat to concave, 0.3-0.5 x 0.3-0.4 mm, pink to dark red. *Gland appendages* 0.1-0.5 x 0.3-0.9 mm, white, prominent on living material, margins entire. *Androphores* exserted above the rim of the cyathia. *Gynophore* scabrous 1.0-1.6 mm. *Capsule* 1.7-2.1 x 1.9-2.2 mm, densely muricate and often puberulous with short, stout hairs. *Styles* 0.3-0.5 mm long, smooth or minutely scabrous. *Seeds* ovoid, 1.1-1.4 x 0.7-0.8 mm, tetragonous, lightly rugose, light brown (or creamy brown with mucilage coat intact).

Specimens examined. NORTHERN TERRITORY: 51 miles E of 'Victoria River Downs', 16° 23' S, 131° 29' E, *G. Chippendale* 6095 (DNA); 10 miles NNE of 'Wavehill' Station, 17° 17' S, 131° 10' E, *M. Lazarides* 6278 (DNA); Victoria River Crossing on Top Springs/Timber Creek Road, 16° 20' S, 131° 06' E, *M.O. Parker* 1009 (DNA); 4 miles S of 'Willeroo' outstation, 15° 19' S, 131° 35' E, *R.A. Perry & M. Lazarides* 2025 (DNA); 46 miles SW of 'Birrimbah' Outstation, 16° 30' S, 131° 52' E, *R.A. Perry & M. Lazarides* 2078 (DNA); 4 km S of No. 10 Bore, Rosewood Station, 16° 16' S, 129° 27' E, *B.W. Strong* 989 (DNA); Victoria River, *F. Mueller s.n.* (MEL 1551015, 1551016, 1551018).
WESTERN AUSTRALIA: near Oscar Range road to Leopold N, *A.J. Ewart s.n.* (PERTH); Drain 7, Packsaddle Creek, Kimberley, 15° 49' S, 128° 41' E, *K.F. Kenneally* 1941 (PERTH); Kunnunurra, *E.M. Scrymgeour* 1673 (PERTH); Smoke Creek, SW of Lake Argyle, 16°45' S, 128°30' E, *A.S. Weston* 12185 (PERTH).

Distribution. This species is known from the Victoria River region in the Northern Territory and adjacent Lake Argyle in Western Australia. (Figure 1)

Habitat. Normally found in heavily textured, alluvial soils.

Affinities. E. maconochieana is closely related to *E. schultzii* Benth. and shares an almost identical indumentum characterised by short (0.2 mm or less), thick, incurved hairs. It is separated from *E. schultzii* by the following key.

1. Gland appendages entire, white; capsules 1.7-2.1 mm long, 1.9-2.2 mm wide; leaf margins entire; prostrate annual ..... *E. maconochieana*
1. Gland appendages denticulate, pink to red; capsules 2.3-2.8 mm long, 3.0-3.5 mm wide; leaf margins serrate; erect, decumbent or prostrate annual or occasionally perennial ..... *E. schultzii*

Conservation status. This species, although rather poorly collected, is not considered as rare or endangered in any part of its range.

Etymology. The species is named in honour of the late Mr J.R. Maconochie, a close friend and former colleague at the Northern Territory Herbarium.

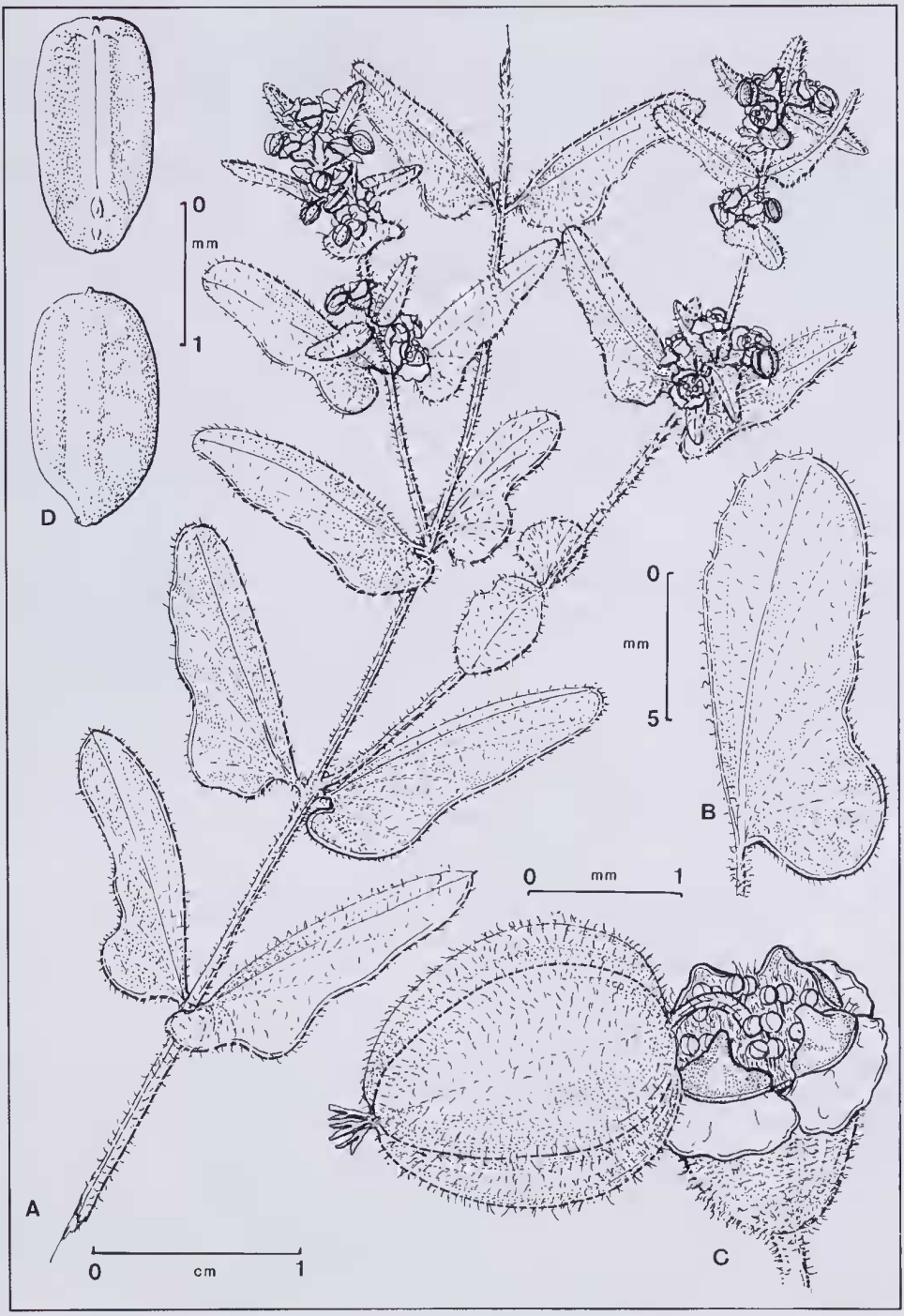

Figure 3. *Euphorbia maconochieana* A - habit, B - leaf, C - cyathia and capsule, D - seed. From *B.G. Thomson* 3486.

4. Euphorbia kimberleyensis B.G. Thomson sp. nov. (Figure 4)

E. schizolepi F. Muell. ex Boiss. affinis, ab qua caulibus et foliis glabris vel glabratis, capsula et semine parvioribus et stylo glabro distinguenda.

Typus: Palm Woodland, Mitchell Plateau, West Kimberley, 14° 50' S, 125° 50' E, 15 June 1976, *K.F. Kenneally* 4921 (holo: PERTH; iso: CANB)

Annual *herb*, prostrate or with ascending or decumbent stems, to 20 cm tall. *Stems* glabrous or puberulous. *Stipules* subulate, 0.2-0.5mm long, margins lacerate. *Leaf lamina* elliptic to obovate, 6-16 x 5-12 mm, surfaces glabrous, margins entire, base oblique, apex apiculate, often carinate. *Petioles* 1-2 mm long. *Inflorescence* in form of cyathia, solitary, axillary, throughout the plant or in clusters of 2-4 on lateral branchlets due to shortening of internodes. *Cyathia* turbinate, 1.5-2.0 x 1.2-1.5 mm, glabrous. *Cyathial lobes* narrow-triangular, margins conspicuously fimbriate. *Glands* orbicular to oblong, flat or concave, 0.6-1.1 x 0.4-0.7 mm, red. *Gland appendages* 0.5-2.0 x 0.8-2.0 mm, white or pink, margins denticulate. *Gynophore* 3.0-4.5 mm long, glabrous. *Capsule* 3.2-3.7 x 3.0-3.5 mm, smooth or tuberculate, glabrous or rarely with sparse pubescence. *Seeds* ovoid, tetragonous, 1.9-2.3 x 1.2-1.4 mm, rugose with flat topped ridges, cream to brown.

Specimens examined. WESTERN AUSTRALIA: Near Lone Dingo VT, 9 km SW of Warrender Hill, 14° 30' S, 125° 45' E, *J. J. Alford* 551 (PERTH); Kalumburu Road, 108.9 km by road N of Gibb River and Ellenbrae Road, 15° 23' S, 126° 12' E, *Aplin et al.* 721 (PERTH); base of Mt Behn, West Kimberley, *W.V. Fitzgerald* 685 (PERTH); Inglis Gap, King Leopold Range, *W.V. Fitzgerald* 755 (PERTH); 1.6 km along Surveyors Fall Track, N of Mitchell Plateau Mining Camp, N Kimberley, 14° 40' S, 125° 47' E, *A.S. George* 14478 (PERTH); Port Warrender, Mitchell Plateau, W Kimberley, 14° 34' S, 125° 16' E, *K.F. Kenneally* 5254 (PERTH); area of Carson Volcanics towards Port Warrender, off the laterite plateau, W Kimberley, 14°34'S, 125°50'E, *K.F. Kenneally* 6704 (PERTH); Crocodile Creek, 5 km E of west end of Koolan Island, W Kimberley, 16° 10' S, 123° 41' E, *K.F. Kenneally* 9719 (PERTH).

Distribution. From Derby, north-east to the Drysdale River, Western Australia. (Figure 1)

Habitat. Found commonly in association with open woodland communities on lateritic red soil or sandstone.

Affinities. This species is closely related to *E. schizolepis* F. Muell ex Boiss. and, in particular to *E. schizolepis* var. *glabra* Benth. Bentham bases his variety on material collected by Mueller in the Gulf of Carpentaria and describes it as perfectly glabrous with the gland appendages much less lobed. A search in K failed to locate any material of Bentham's variety. I have, however, examined a specimen in MEL which matches the protologue and is probably part of the type collection. This material is clearly not referable to *E. kimberleyensis*, differing in its larger cyathium and glaucous upper stems which are commonly seen on the more glabrescent forms of *E. schizolepis*. *E. kimberleyensis* is also restricted to the far north of Western Australia and does not occur in the 'Gulf of Carpentaria' which is the rather generalised collection locality given by Bentham for his variety *glabra*.

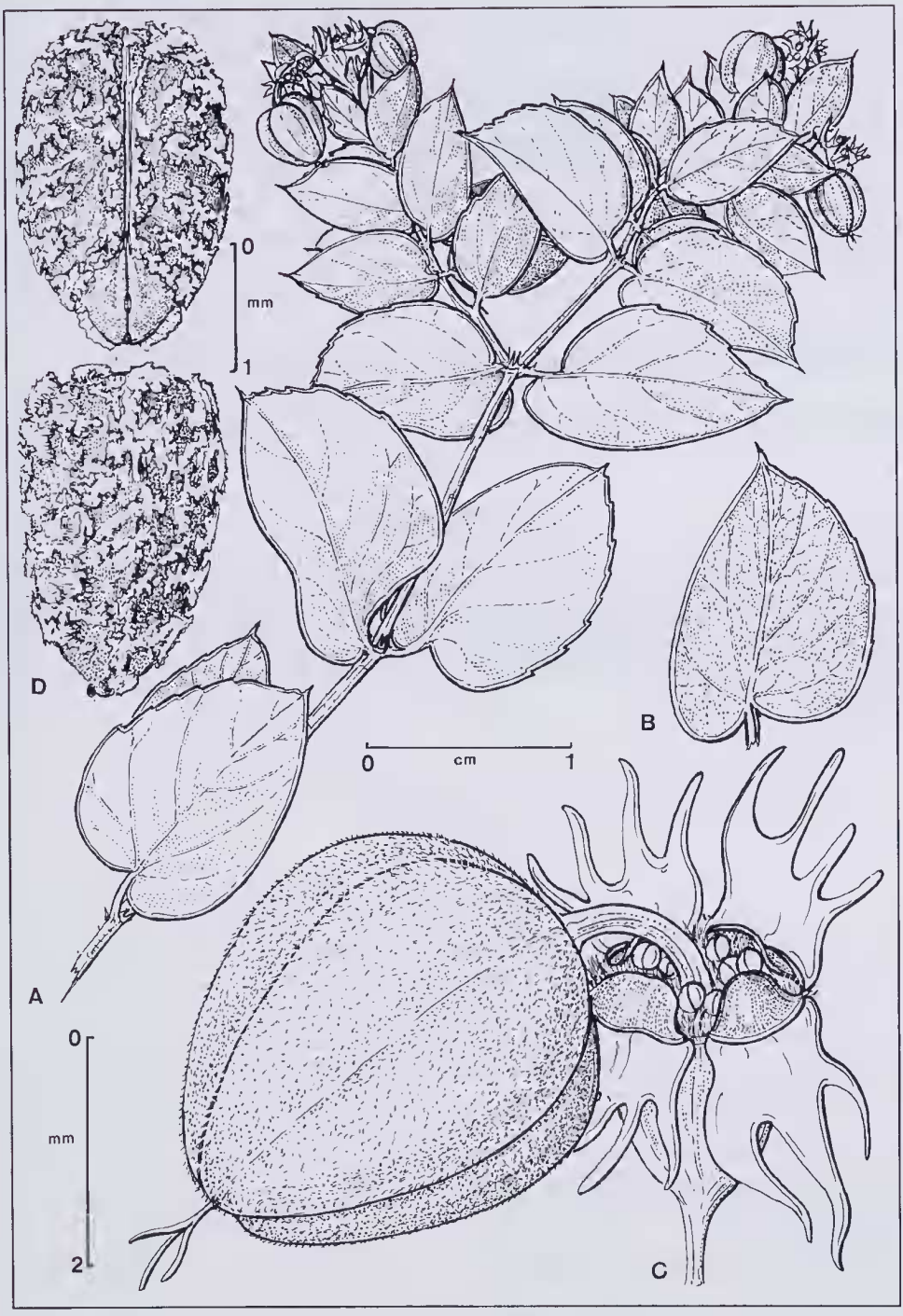

Figure 4. *Euphorbia kimberleyensis* A - habit, B - leaf, C - cyathia and capsule, D - seed. From *K.F. Kenneally* 4921

E. kimberleyensis may be distinguished from *E. schizolepis* by the following key.

1. Herbaceous, prostrate or weakly ascending annual, glabrous or occasionally with puberulous stems; capsules 3.2-3.7 mm long and 3.0-3.5 mm wide, smooth or tuberculate, glabrous or rarely with sparse pubescence; styles glabrous; seeds 1.9-2.3 mm long ..... *E. kimberleyensis*
1. Erect annual or perennial, pilose to villous, rarely glabrescent; capsules 4.0-6.0 mm long and 4.5-6.5 mm wide, surface obscured by densely tomentose indumentum; styles distinctly pubescent; seeds 2.7-3.5 mm long ..... *E. schizolepis*

Conservation status. This species appears to be common throughout its limited range.

Etymology. The specific epithet relates to the species distribution within the Kimberley region.

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References

Bentham, G. (1873). "Flora Australiensis" Vol.6. (Lovell Reeve, London.)

Bentham, G. and Hooker, J.D. (1880). "Genera Plantarum" Vol.3. (Lovell Reeve, London.)

Croizat, L. (1938). Euphorbiaceae *in* Degener, O. "Flora Hawaiiensis" (Degener, U.S.A.)

Gaucher, L. (1898). Étude Anatomique du Genre *Euphorbia* L.

Hassall, D.C. (1976). Numerical and Cytotaxonomic Evidence for Generic Delimitation in Australian Euphorbieae. Austral. J. Bot. 24:633-640.

Hassall, D.C. (1977). The Genus *Euphorbia* in Australia. Austral. J. Bot. 25:429-453.

Rafinesque, C.S. (1817). Second Decade of Undescribed American Plants. Amer. Monthly Mag. 2:119.

Webster, G.L. (1975). Conspectus of a New Classification of the Euphorbiaceae. Taxon 24:593-601.

Webster, G.L., Brown, W.V. and Smith, B.N. (1975). Systematics of Photosynthetic Carbon Fixation Pathways in *Euphorbia*. Taxon 24:27-33.

Wheeler, L.C. (1941). *Euphorbia* subgenus *chamaesyce* in Canada and the United States, exclusive of Southern Florida. Rhodora 43:97-286.

Wheeler, L.C. (1943). The Genera of the Living Euphorbieae. Am. Midl. Nat. 30:456-503.

Willis, J.C. (1966). "A Dictionary of the Flowering Plants and Ferns" Edn 7. (Cambridge at the University Press, London.)